

EAST CANYON RESERVOIR



Introduction

East Canyon Reservoir is a large reservoir behind the northern Wasatch Front. It drains the Snyderville Basin area, including Park West Ski Resort. Close proximity to population centers on the northern Wasatch Front and a well equipped State Park make this a very popular reservoir for year round recreation.

The current dam, a concrete arch, was created in 1966. The spillway is a spectacular waterfall off the west side of the dam. The reservoir shoreline is owned by the

State of Utah, and public access is unrestricted. Vehicular access to the west side of the reservoir is restricted. In addition to recreational use the reservoir water is used for irrigation (90%), and culinary (10%). As urban sprawl continues to displace agricultural lands, the fraction consumed for culinary purposes is expected to increase.

Characteristics and Morphometry	
Lake elevation (meters / feet)	1,734 / 5,690
Surface area (hectares / acres)	277 / 684
Watershed area (hectares / acres)	40,146
Volume (m ³ / acre-feet)	
capacity	63,155 / 51
conservation pool	
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Drawdown (m ³ / acre-feet)	28,701,122 / 23,268
Depth (meters / feet)	
maximum	60 / 197
mean	23 / 75
Length (km / miles)	5.64 / 3.50
Width (km / miles)	2.3 / 1.43
Shoreline (km / miles)	16 / 9.94

Location

County	Morgan
Longitude / Latitude	111 35 20 / 40 54 20
USGS Maps	East Canyon Reservoir -1975
DeLorme's Utah Atlas & Gazetteer™	Page 53, A-6
Cataloging Unit	Lower Weber (16020102)

Recreation

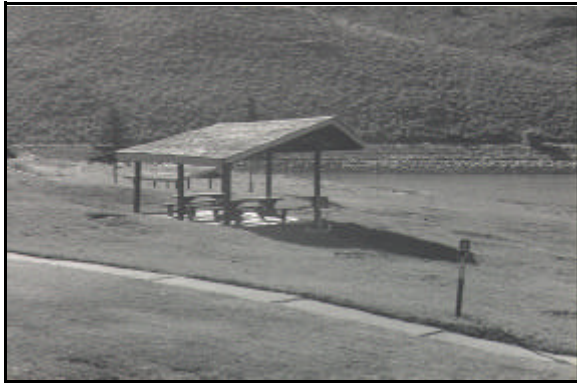
East Canyon Reservoir is in East Canyon between I-80 and I-84. The all year access is U-66 from Morgan (Exit 103 off I-84). Alternate routes U-65 from the south (Exit 134 off I-80 in Parley's Canyon) or the north (Exit 115 off I-84 in Henefer). U-66 follows the north shore of the reservoir, while U-65 follows the east shore. There is

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southern half of the west shore by a gravel road off U-65. Driving time is about 1/2 hour from the mouth of either Parley's or Weber Canyons.

Cross-country skiing, fishing, boating, sailboarding, swimming, camping, picnicking, ice fishing, and water skiing are all popular. In 1992, the state park recorded 108,395 visitors, ranging from 252 visitors in December to 25,716 in June.



Recreational facilities include a wide concrete boat ramp, modern rest rooms with showers, sewage disposal, a 31 unit campground with a large overflow area, and fish cleaning stations. A concessionaire provides a snacks and boat rentals. The park is located on U-66 on the north shore of the reservoir, one mile west of the junction with U-65. Entrances are well marked. There are no other campgrounds in the area, and little public land for dispersed camping. East Canyon Resort is located near the southern end of the reservoir. The resort has a wide range of facilities available to the public.



Watershed Description

East Canyon Reservoir is an impoundment of East Canyon Creek. The watershed drains the back side of the Wasatch Front, from behind Big Cottonwood Canyon to behind Emigration Canyon.

The area around the watershed is relatively dry

compared to the areas closer to the Wasatch Front. Vegetation is mostly sage-grass, but there are areas of spruce-fir in sheltered, north facing slopes. Unlike the canyons that drain to the west, the scenery is not the lush forests most recreationalists hope to find in the mountains.

The watershed extends south and west from the reservoir. The highest elevations are along the Wasatch Front itself, with 10,000 foot ridgelines common at the south end of the watershed. The eastern border of the watershed is only slightly higher than the stream elevations in many areas. Like many areas behind the Wasatch Front, the divides between drainages are very low, with Parley's Summit, Snyderville basin to Park City, and Parley's Park all being major divides at low elevations. Silver Creek was once the headwaters of East Canyon Creek, but appears to have been diverted into the Weber Basin in recent geologic history.

The Snyderville Basin is rapidly urbanizing, creating changes in water quality for this watershed. Nutrient and sediment loading within the watershed are major issues at the present time. Pollutant sources include golf courses, dairies and other cattle operations, construction and development sites, erosion and loss of riparian habitat, and discharge from the municipal wastewater treatment facility. These sources are the likely reasons for water quality problems at the reservoir. The East Canyon Technical Advisory Committee is attempting to bring about a coordinated effort to control sources of pollution and restore impaired water quality. Currently there is a spirit of cooperation by all parties associated with these problems.

The watershed high point is 2,753 m (9,034 ft) above sea level, thereby developing a complex slope of 9% to the reservoir. The average stream gradient above the reservoir is 4.2% (220 feet per mile). The inflows are East Canyon Creek, Dixie Hollow, Taylor Hollow, and Sawtooth Creek. The outflow is East Canyon Creek.

The watershed is made up of high mountains, low mountains, and valleys. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of pine, spruce-fir, oak-maple, alpine tundra, and sagebrush-grass. The watershed receives 41 - 102 cm (16 - 40 inches) of precipitation annually. The frost-free season around the reservoir is 80 - 100 days per year.

In 1980, the watershed was zoned as follows: Reserve--no development (57%), multiple use (39%), pioneer trail corridor (3%), and agriculture (1%). Presently, all six square miles of Snyderville Basin, a relatively flat area of the upper part of the watershed, is under heavy development pressure. The watershed is almost entirely privately owned, leaving it vulnerable to development.

Limnological Assessment

The water quality of East Canyon Reservoir is fair. It

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Limnological Data

Data averaged from STORET sites: 492516, 492517, 492518

Surface Data	<u>1980</u>	<u>1989</u>	<u>1992</u>
Trophic Status	E	M	E
Chlorophyll TSI	-	46.16	45.39
Secchi Depth TSI	46.01	43.10	45.61
Phosphorous TSI	64.59	56.84	67.46
Average TSI	55.30	48.70	52.82
Chlorophyll <i>a</i> (ug/L)	-	5.1	7.4
Transparency (m)	1.5	3.2	2.8
Total Phosphorous (ug/L)	60	39	82
pH	8.3	8.5	8.6
Total Susp. Solids (mg/L)	5	-	4.8
Total Volatile Solids (mg/L)	-	-	5
Total Residual Solids (mg/L)	-	-	2
Temperature (°C / °f)	13/55	20/68	18/64
Conductivity (umhos.cm)	485	609	676

Water Column Data

Ammonia (mg/L)	0.05	0.02	0.08
Nitrate/Nitrite (mg/L)	0.55	-	0.08
Hardness (mg/L)	241	-	269
Alkalinity (mg/L)	163	-	176
Silica (mg/L)	-	-	1.6
Total Phosphorous (ug/L)	97	84	171

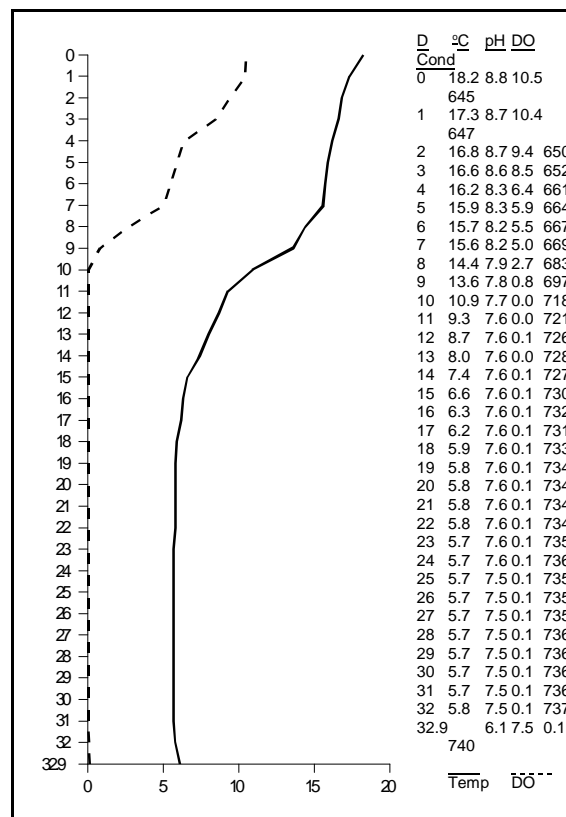
Miscellaneous Data

DO (Mg/l) at 75% depth	3.1	-	0.1
Stratification (m)	9-14	8-13	7-11
Limiting Nutrient	N	N	N
Depth at Deepest Site (m)	35	44.4	32.9

is considered to be hard with a hardness concentration value of approximately 255 mg/L (CaCO₃). The parameters that have exceeded State water quality standards for defined beneficial uses are phosphorus, temperature and dissolved oxygen. The average concentration of total phosphorus in the water column has consistently exceeded the State pollution indicator for phosphorus of 25 ug/L. In 1992 phosphorus concentration averaged 171 ug/L in the water column with some individual values approaching 400 ug/L. This high concentration is due in part to high nutrient loadings from the watershed where a major municipal wastewater treatment plant discharges into East Canyon Creek and is increased due to stratified conditions, with anoxic conditions present near the bottom. These types of conditions allow for the reintroduction of phosphorus previously stored in the sediments. High nutrient loadings

lead to production of blue-green algal blooms, and excessive production of algae. This high production is responsible for impaired water quality. Dissolved oxygen

concentrations in late summer consistently substantiate the fact that water quality impairments do exist. Concentrations dropped dramatically below the thermocline (9-10 meters) to virtually anoxic conditions. In addition surface water temperatures exceed the criteria (20°C) for a cold water fishery. These factors coupled together eliminate a very large portion of the reservoir as fishery habitat. Because of these impairments the reservoir and its watershed have been the focus of a Clean Lakes Phase I study. In addition to the conclusion from that study programs are being implemented to control nutrient loading from the watershed to improve water quality throughout the watershed including the reservoir. TSI values categorize the reservoir as eutrophic. All three periods of record indicate that the reservoir is characterized as a nitrogen limited system. Although the system is nitrogen limited efforts to improve water quality focus on the control of phosphorus into the system. The goal is to reduce the concentration of all nutrients and to push the reservoir towards phosphorus limitation. In addition there are ongoing studies to evaluate the effect of these programs and to track water quality trends in the reservoir. According to DWR fish kills have been reported in recent years. In late summer of 1994 a fish kill was documented in the south arm of the reservoir. It should be noted that in above normal wet years the tendency for a



fish kill is reduced. In addition to poor water quality conditions the fish populations is also infected with the parasite, *Lernaea*. *Lernaea* is an anchor worm that causes lesions and sores on the external surface of fish. These conditions and the stress factors associated with water quality are responsible for the loss of fish at the reservoir. The reservoir supports populations of rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*Oncorhynchus clarki*) and some brown trout (*Salmo trutta*). DWR typically stocks the reservoir with approximately 300,000 fingerling rainbow. The reservoir has not been chemically treated by the DWR to eliminate rough fish competition, so populations of native fish may be present. Macrophytes are not typically present and are not a problem.

Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm ³ /liter)	% Density By Volume
<i>Stephanodiscus niagarae</i>		11. 4 3 9
68.91		
<i>Aphanizomenon flos-aquae</i>		2. 4 3 0
14.64		
<i>Ceratium hirundinella</i>	1.872	11.28
<i>Fragilaria crotonensis</i>	0.458	2.76
<i>Melosira granulata</i>		
var. angustissima	0.126	0.76
<i>Melosira granulata</i>	0.086	0.52
<i>Cosmarium sp.</i>	0.077	0.47
<i>Oocystis sp.</i>	0.067	0.40
<i>Closteriopsis longissima</i>		
var. tropica	0.033	0.20
Unknown spherical		
green alga	0.005	0.03
<i>Ankistrodesmus falcatus</i>	0.004	0.03
Total	16.597	
Shannon-Weaver Index [H']		
Species Evenness	0.42	
Species Richness [d]	0.42	

As observed the phytoplankton community is dominated by blue-green algae and diatoms that are indicative of eutrophic waters.

Pollution Assessment

Nonpoint pollution sources include grazing, recreation, agricultural runoff, and urban wastes. Urban pollution includes runoff from suburban and commercial development, construction areas, ski slope maintenance activities, and golf course maintenance activities.

The only point source of pollution in the watershed is the East Canyon Wastewater Treatment Plant, located at the top of East Canyon, just north of I-80. It processes

sewage from the Snyderville Basin area and discharges it into East Canyon Creek.

Beneficial Use Classification

Information	
Management Agencies	
Wasatch Front Regional Council	292-4469
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Recreation	
Golden Spike Empire Travel Region (Ogden)	627-8288
East Canyon State Park	829-6866
East Canyon Resort	355-3460
Reservoir Administrators	
Department of the Interior	538-1467

The state beneficial use classifications include: recreational bathing (swimming) 2A, boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

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